UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/349,087	07/08/1999	KIM B. ROBERTS	10420ROUS01U	6208

626 7590 02/04/2004

NORTEL NETWORKS LIMITED
P. O. BOX 3511, STATION C
OTTAWA, ON K1Y 4H7
CANADA

EXAMINER	
ODLAND, DAVID E	
ART UNIT	**PAPER NUMBER**
2662	10

DATE MAILED: 02/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/349,087	ROBERTS, KIM B.	
	Examiner	Art Unit	
	David Odland	2662	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 November 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10,12-24 and 26-28* is/are rejected.

7)☒ Claim(s) *11 & 25* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

1. The following is a response to the amendments filed on 11/03/2003.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sherman et al. (USPN 6,047,005), hereafter referred to as Sherman.

Referring to claim 1, Sherman discloses a method for transmitting a continuous digital signal of an arbitrary rate R1 (transmitting a DS1 signal known to have a rate of 1.544 Mbps as a VT1.5 signals (see column 10)) over a synchronous network (the VT1.5 signal is transported over a Synchronous Optical Network (SONET) (see column10)), comprising:

selecting a fixed length container signal of a rate R (the VT1.5 signal transported in a selected SONET frame (see column 10)), where R is higher than said arbitrary rate R1 of said continuous signal (the SONET signal is transported at an OC-3 which is known to be 155.52 Mbps and therefore is greater than the VT1.5 rate of 1.544 Mbps)); and

at a transmit site, distributing the bits of said continuous signal into valid locations of a frame of said container signal (the VT1.5 data is included in the SONET frame (see column 10))

and providing stuff bits into invalid locations (stuffing bits are also included in the SONET frame (see column 10));

wherein said invalid time slots are uniformly dispersed across the frame (the SONET standard regarding the mapping of VT1.5 signals into SONET frames defines stuff bits that are uniformly dispersed).

Sherman does not disclose that the rate R1 is an arbitrary rate. However, It would have been obvious to one skilled in the art at the time of the invention to imple3mt the virtual tributary (VT) mapping method of Sherman using an arbitrary rate rather than just the DS1 rate because doing so would make the system more flexible and versatile. Furthermore, the SONET standard includes mapping a variety of VT groups (namely, VT1.5, VT2,VT3 and VT6), that each accommodate different rates that are lower than R. Therefore, It would have been obvious to one skilled in the art at the time of the invention to implement the method of Sherman using the rates associated with the other standardized VT groups because doing so would lower developmental costs since using the standardized groups will be cheaper than having to implement as entirely new grouping.

Referring to claim 2, Sherman discloses the system discussed above. Furthermore, Sherman discloses that the container signal is a SONET/SDH signal, and said synchronous network is a SONET/SDH network (the VT1.5 is transported in a SONET frame, which inherently is transported over a SONET network (see column 10)).

Referring to claim 3, Sherman discloses the system discussed above. Furthermore, Sherman discloses that the continuous digital signal is also a SONET/SDH signal (the virtual

tributary, VT1.5, signal is interleaved into a single synchronous transport signal (STS-1) therefore it is a synchronous tributary (see column 10)).

Referring to claim 4, Sherman discloses the system discussed above. Furthermore, Sherman discloses that the SONET/SDH signal comprises a plurality of transparent tributaries (each VT1.5 signal transported by the SONET frame consists of 24 lower tributaries (each corresponding to a DS0 signal and therefore making up one DS1 signal per VT1.5 signal) (see column 11)).

3. Claims 5, 21-24,26, 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sherman in view of Urbansky (USPN 5,263,056), hereafter referred to as Urbansky.

Referring to claim 5, Sherman discloses the system discussed above. Furthermore, Sherman discloses that the stuff bits are fixed stuff bits (the SONET standard defines fixed stuff bits for mapping VT1.5 signals into SONET frames). Sherman does not disclose that the stuff bits comprise adaptive stuff bits. However, Urbansky discloses locations that comprise adaptive stuff bits (justification locations contain variable stuff bits (see column 1)). It would have been obvious to one skilled in the art at the time of the invention to utilize adaptive stuff bits, as taught in Urbansky, in the system of Sherman, because doing so would provide the SONET frame with more flexibility when transporting the lower rate tributary (i.e. the virtual tributaries can 'float' in the SPE, a method well known in the art). Furthermore, using variable stuff bits allow the system to adapt to other VT groups other than VT1.5, thereby making the system of Sherman more flexible.

Referring to claim 21, Sherman discloses a method for transmitting a continuous digital signal of a rate R1 over a synchronous network comprising: selecting a container signal of a rate R where R is higher than said rate R1 of said continuous signal; and mapping said continuous digital signal into said container signal by assigning from a set of assignable locations in said container signal locations.

Sherman does not disclose that the locations include adaptive stuff bits where said set of assignable locations comprises a significant fraction of the locations within said container signal. However, Urbansky discloses locations that comprise adaptive stuff bits (justification locations contain variable stuff bits (see column 1)). It would have been obvious to one skilled in the art at the time of the invention to utilize adaptive stuff bits, as taught in Urbansky, in the system of Sherman, because doing so would provide the SONET frame with more flexibility when transporting the lower rate tributary (i.e. the virtual tributaries can 'float' in the SPE, a method well known in the art). Furthermore, using variable stuff bits allow the system to adapt to other VT groups other than VT1.5, thereby making the system of Sherman more flexible.

Sherman also does not disclose that the set of assignable locations comprises a significant fraction of the container. However, it would have been obvious to one skilled in the art at the time of the invention to have a significant number of locations, in the SONET frame of Sherman, because doing so would make the system of Sherman more flexible, since more locations can accommodate more adaptive stuff bits and allow for smaller signals to me mapped to the frame.

Referring to claim 22, Sherman discloses the system discussed above. Sherman does not disclose that the location and the number of stuff bits assigned depend on the phase of said continuous digital signal. However, it would have been obvious to one skilled in the art at the

time of the invention to vary the locations and number of stuff bits in the system of Sherman because doing so would allow the system to map signals of different phases, thus making the system of Sherman more flexible.

Referring to claim 23, Sherman discloses the system discussed above. Furthermore, Sherman discloses that the step of mapping comprises assigning a definite number of locations as fixed stuff bits within a frame of said container signal (the SONET standard defines a number of fixed stuff bits to be included when mapping the VT1.5 signal into the SONET frame)). Sherman does not disclose adjustable the number of locations as said locations to include adaptive stuff bits within said frame. However, it would have been obvious to one skilled in the art at the time of the invention to adjust the number of locations of adaptive stuff bits in the system of Sherman because doing so would allow the system to map signals of different phases, thus making the system of Sherman more flexible.

Referring to claim 24, Sherman discloses the system discussed above. Furthermore, Sherman discloses that the step of adding comprises: partitioning said frame into a number of equally sized data blocks and said definite number of locations (according to the SONET standard, the SONET frame is partitioned into 810 locations) and for each block, determining a control function B indicative of said adjustable number (inherently data put into the 810 bytes of the frame are under some kind of control function) and mapping data bits and said stuff bits within the block based on said control function (stuff bits are inherently mapped according to some control function).

Referring to claims 26 and 27, Sherman discloses the system discussed above. Sherman does not disclose recovering said continuous signal from said synchronous signal at a receive

site, by extracting the data bits of said continuous signal from said frame. However, It would have been obvious to one skilled in the art at the time of the invention to recover the VT1.5 signal at a receiver since doing so would allow for communication to take place.

Referring to claim 28, Sherman discloses the system discussed above. Furthermore, Sherman discloses that the continuous signal is a SONET/SDH signal, said container signal is a SONET/SDH signal, and said synchronous network is a SONET/SDH network (the VT1.5 is transported in a SONET frame, which inherently is transported over a SONET network (see column 10)).

4. Claims 6-10, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Sherman in view of Urbansky and further in view of Upp (USPN 4,998,242), hereafter referred to as Upp.

Referring to claim 6, Sherman discloses the system discussed above. Furthermore, Sherman discloses adding to the bits of to said continuous digital signal including a definite number of locations for accommodating said fixed stuff bits within said frame (according to the SONET specification regarding mapping VT1.5 into frames, a definite number of locations is used for the fixed stuff bits).

Sherman does not disclose determining the phase difference between said continuous digital signal and said container signal and an adjustable number of locations for accommodating said adaptive stuff bits within said frame; based on said phase difference. However, Upp discloses a system wherein the phase difference between a VT group and the SONET output bus is obtained. It would have been obvious to one skilled in the art at the time of the invention to detect the

phase difference between the VT signal and the SONET frame so that the VT pointers can be correctly generated.

Referring to claim 7, Sherman discloses the system discussed above. Sherman does not disclose that the adjustable number is significantly larger than said definite number. However, it would have been obvious to one skilled in the art at the time of the invention to have more adjustable locations than definite locations, in the system of Sherman, because doing so would make the system of Sherman more flexible, since more locations can accommodate more stuff bits and smaller payloads can be carried.

Referring to claim 8, Sherman discloses the system discussed above. Sherman does not disclose that the definite number includes transport overhead (TOH) locations and remainder fixed stuff bits locations. However, it would have been obvious to one skilled in the art at the time of the invention to include TOH in the definite number of locations since the TOH is fixed and does not use up payload space of the SONET frame.

Referring to claim 9, Sherman discloses the system discussed above. Furthermore, Sherman discloses providing maintenance, operation, administration and provisioning information in said TOH locations (the SONET standard defined the TOH as having operation, administration and provisioning information called OA&M).

Referring to claim 10, Sherman discloses the system discussed above. Furthermore, Sherman discloses that the step of adding comprises: partitioning said frame into a number of equally sized data blocks and said definite number of locations; for each block (the SONET standard defines a sonnet frame as having a definite number or byte partitions, namely, 810), Sherman does not disclose determining a control function B indicative of said adjustable number

and adding said adaptive stuff bits based on said control function (adaptive stuff bits if implemented in Sherman would inherently be controlled by some function).

5. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sherman in view of Cummings et al. (USPN 6240087), hereafter referred to as Cummings.

Referring to claim 12, Sherman discloses the system discussed above. Sherman does not disclose recovering the continuous signal. Cummings discloses recovering a continuous signal from said synchronous signal at a receive site (a DS1 signal is recovered from a SONET VT1.5 signal (see column 31 lines 30-67)), by extracting the data bits of said continuous signal from said valid timeslots of said frame (the inbound VT1.5 receiver extracts the DS1 signals from the inbound VT1.5 SPEs of the received SONET frames (see column 31 lines 30-67)). It would have been obvious to one skilled in the art at the time of the invention to utilize a receiver as taught by Cummings in the system of Sherman, because such a receiver provides a method of properly recovering the continuous digital signal (i.e. the original DS1 signal) from the synchronous network (i.e. the SONET frame of the SONET network) so that the data can be further processed by the receiving end, thus allowing for proper communications to take place across the SONET network.

6. Claims 13, 16,17,19 and 20, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Sherman in view of Upp (USPN 4,998,242).

Referring to claim 13, Sherman discloses a synchronizer for mapping a continuous format signal of an arbitrary rate for transport over a synchronous network as a transparent

tributary signal (transmitting a DS1 signal known to have a rate of 1.544 Mbps as a VT1.5 signals (see column 10)), comprising:

a data recovery unit for recovering, from said continuous format signal, a stream of data bits and a data clock indicative of said arbitrary rate (the VT1.5 signal transported in a selected SONET frame and thus is recovered and mapped to the SONET frame and inherently has a clock related to it (see column 10);

a mapping unit for extracting said stream of data bits from said receiver buffer unit at a mapping clock rate, and inserting stuff bits and said data bits into said frame at a block clock rate according to said control function B (the VT1.5 signal is mapped into a selected SONET frame (see column 10)). Note, inherently the frame and VT signal have associated clocks and the mapping takes place according to a control function.

Sherman does not disclose that a receiver buffer unit for receiving said stream of data bits, determining a phase difference between said arbitrary rate and the rate of a frame of said tributary, and generating a control function B. However, Upp discloses a system wherein the phase difference between a VT group and the SONET output bus is obtained. It would have been obvious to one skilled in the art at the time of the invention to detect the phase difference between the VT signal and the SONET frame so that the VT pointers can be correctly generated.

Referring to claim 16, Sherman does not explicitly disclose of a block clock gapper, a mapping clock gapper or using these clock gapers to map the VT signal into the SONET frame. However, it would have been obvious to one skilled in the art to implement such items in the system of Sherman in order to properly fill the SONET frame. Also, note the system of Sherman must have some type of clock 'gappers' in order for the VT1.5 signal to be mapped to the frame.

Referring to claim 17, Sherman discloses the system discussed above. Sherman does not disclose a receiver OH FIFO for re-arranging a plurality of transport overhead TOH locations for seamless transport of said frame within said synchronous network. However, it would have been obvious to one skilled in the art to implement such a FIFO since doing so will prevent errors. Namely, if the TOH is not properly re-arranged, error will occur.

Referring to claims 19 and 20, Sherman discloses the same system as discussed above in the rejection of claim 13. Sherman does not explicitly disclose elements of the receiver that receive the transports VT1.5 signal. However, it would have been obvious to one skilled in the art at the time of the invention to implement a receiving side and the elements necessary for stripping down the SONET frame into DS1 data for the destination, because without such elements, nodes of the system would not be able to communicate properly, thus making the system stagnant.

7. Claims 14 and 15, as best understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Sherman in view of Upp and further in view of Choi (USPN 5,131,013), hereafter referred to as Choi.

Referring to claims 14 and 15, Sherman discloses the system discussed above. Sherman does not disclose that the receiver buffer unit comprises: an elastic store for temporarily storing an amount of data bits of said stream at said data rate clock and providing said data bits to said mapping unit at said block clock rate; a digital PLL for determining the phase difference between said arbitrary rate and said mapping clock and providing said control function B. However, Choi discloses a system wherein VT1.5 signals are processed using elastic storage and digital PLL

(see column 1 lines 17-40 and figure 1)). Since these items are commonly used in mapping VT1.5 signals, It would have been obvious to one skilled in the art at the time of the invention to use them in the system of Sherman because doing so would reduce developmental costs, since entirely new methods of storage and phase detection do not have to be developed.

8. Claim 18, as best understood, is rejected under 35 U.S.C. 103(a) as being unpatentable over Sherman in view of Upp and further in view of Shiragaki (USPN 5663820), hereafter referred to as Shiragaki.

Referring to claim 18, Sherman discloses the system discussed above. Sherman does not disclose an overhead multiplexer for adding operation, administration, maintenance and provisioning data into said TOH locations. However, Shiragaki discloses a SONET system wherein an optical mux is used to multiplex an OA&M signal into a SONET frame (see column 1 lines 57-67)). It would have been obvious to one skilled in the art at the time of the invention to multiplex OA&M messages in the frames of Sherman because such messages are important for proper maintenance of the SONET network, thereby making sure the SONET network remains reliable.

Allowable Subject Matter

9. Claims 11 and 25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

10. Applicant's arguments filed 11/03/2003 have been fully considered but they are not persuasive.

The applicant argues on page 12, paragraphs 3 and 4, that none of the references taken alone or in combination teach or suggest adaptive mapping. The Examiner respectfully disagrees. The term 'adaptively' merely means to suitably perform some function. The Sherman system functions to adapt T1 signals for transport in SONET frames using stuff bits (see column 10). Since this functionality is 'adaptive', the Sherman system does indeed perform 'adaptive mapping'.

Conclusion

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Odland, who can be reached at (703) 305-3231 on Monday – Friday during the hours of 8am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hassan Kizou, can be reached at (703) 305-4744. The fax number for the organization where this application or proceeding is assigned is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist, who can be reached at (703) 305-4750.

deo

February 1, 2004

JOHN PEZZLO
PRIMARY EXAMINER